

Work Order ID 80933***80933***

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Monday, March 05, 2012 12:57:39 PM

Item ID: D6104-005 Accept ***N900040100*** Setup Start ***NS1***
Revision ID: Stop ***NS2***
Item Name: Round Billet, 17-4
Start Date: 3/5/2012 Start Qty: 6.00 ***6*** Cust Item ID:
Required Date: 3/12/2012 Req'd Qty: 6.00 ***6*** Customer:
Reference:

Approvals: Process Plan: ✓ Date: 12-03-5 Tooling: _____ Date: _____ Run Start ***NR1***
QC: _____ Date: _____ SPC (Y/N): _____ Date: _____ Stop ***NR2***

Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
Draw Nbr	Revision Nbr								
D6104	Rev B								

100

0.00

100

Purchasing

Purchasing

PURCHASING

Memo

0.00

Issue P/O: 14358 a) Description: S.S round billet b) Ø4.00" x
5.10" long c) Tolerance on all dimensions are +0.030"/-0.000" d) Material:
17-4PH Stainless steel (Ams 5643 or Aisi 630)e) One blank makes 2 parts f)
Material certification required

12-03-6

110

Receive & Inspect for Damage & Mat'l Certs

0.00

110

Packaging

Packaging

Memo

0.00

Ensure material certification is attached

12/3/13 (6)

120

QC6- Inspect dimensions to drawing

0.00

120

QC

Quality Control

Memo

0.00

Ensure Material certification comply to Dwg D6104

12/3/13 6

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

Resolution: _____ Disposition: _____ QA: N/C Closed: _____ Date: _____

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

NOTE: Date & initial all entries

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Monday, March 05, 2012 12:57:39 PM

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Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
130	Identify as per dwg & Stock Location: <u>CNC</u>	0.00							
130									
Packaging	Memo	0.00							
Packaging									
140	QC21- Final Inspection - Work Order Release	0.00							
140									
QC	Memo	0.00							
Quality Control									

12/3/14

12-03-14

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

Resolution: _____ Disposition: _____ QA: N/C Closed: _____ Date: _____

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NOTE: Date & initial all entries

Picklist Print

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Monday, March 05, 2012 12:57:47 PM

Work Order ID: 80933

80933

Parent Item: D6104-005

D6104-005

Parent Item Name: Round Billet, 17-4

Start Date: 3/5/2012

Required Date: 3/12/2012

Start Qty: 6.00

Required Qty: 6.00

Comments: IPP A: 01.05.08New Issue EC

Component Item ID/ Item Name	Replacement Item ID	Mfg/ Purch	Bin Item	Primary Location	Last Location	Route Seq ID	Unit of Measure	Qty on Hand	Qty per Kit	Total Qty	Qty Issued	Date Issued	Status
D6104-005P		Purchased	No			110	Each	0.0000	1	6			
D6104-005P									**				
17-4 SS Roundbar 4.00"OD													

11/23/13 (6)

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

Resolution: _____ Disposition: _____ QA: N/C Closed: _____ Date: _____

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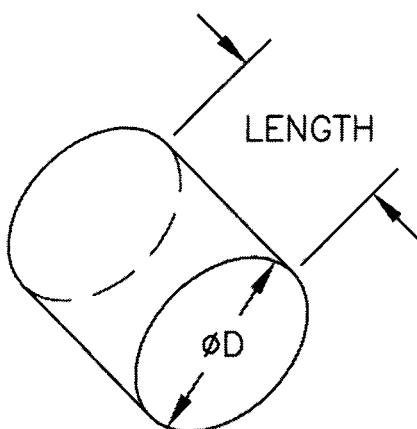


DESIGN <i>RT</i>	DRAWN BY <i>[Signature]</i>	DART AEROSPACE LTD HAWKESBURY, ONTARIO, CANADA	
CHECKED <i>[Signature]</i>	APPROVED <i>[Signature]</i>	DRAWING NO. D6104	Rev. B SHEET 1 OF 1
DATE 02.11.25		TITLE ROUND BILLET, 17-4	SCALE NTS
A	01.04.10	NEW ISSUE	
B	02.11.25	CLARIFY ALLOY SPEC ADDED D6104-009/-011 REDUCE LENGTH OF BILLETS	

RELEASED

02.11.29 *[Signature]*

SPECIFICATION CONTROL DRAWING



MATERIAL: 17-4 PH SS (AMS 5643 OR AISI 630) MIN UTS = 170 KSI (38 HRc)

PURCHASE MATERIAL ACCORDING TO THE FOLLOWING TABLE. SPECIFY ALLOY, DIAMETER x LENGTH (+0.030/-0.000) AS SHOWN.

TOLERANCE ON ALL DIMENSIONS IS +0.030/-0.000.

ALL DIMENSIONS ARE IN INCHES

Part No.	Alloy	D (Diameter)	Length
D6104-001	17-4 PH STAINLESS STEEL	Ø3.00	3.80
D6104-003	17-4 PH STAINLESS STEEL	Ø3.25	3.80
D6104-005	17-4 PH STAINLESS STEEL	Ø4.00	5.10
D6104-007	17-4 PH STAINLESS STEEL	Ø4.50	5.10
D6104-009	17-4 PH STAINLESS STEEL	Ø5.25	4.10
D6104-011	17-4 PH STAINLESS STEEL	Ø6.50	4.10

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W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

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**Castle Metals®**

A. M. Castle & Co.

BORDEREAU DE MARCHANDISES

Page 1 of 2

No de Formulaire d'Emballage / Shipment No: 1221743

Expédié de / Ship From: A. M. Castle & Co. (Canada) Inc. MONTREAL 835-SELKIRK AVENUE POINTE CLAIRE, QUEBEC H9R 3S2		Vendu à / Sold To: DART AEROSPACE LTD 1270 ABERDEEN HAWKESBURY, ON K6A 1K7 CA		Expédié à / Ship To: DART AEROSPACE LTD 1270 ABERDEEN HAWKESBURY, ON K6A 1K7 CAN		Livré à / Deliver To: DART AEROSPACE LTD 1270 ABERDEEN HAWKESBURY, ON K6A 1K7 CA			
Date d'expédition / Date Shipped 08-MAR-2012		F.O.B. ORIGIN		Modalités de transport / Freight Terms Prepaid		Transporteur / Carrier MANITOULIN		No du Bon de connaissance / BOL No 1221743-2	

Détails d'expédition / Shipment Details				Destination finale / Final Destination Branch - MON			
--	--	--	--	--	--	--	--

N° de commande / Order No 2055776		N° de ligne / Line No 1		N° d'article / Item No 42464.MO		Description 4.0000.RD.17CR-4NI.STAINLESS.RT.SOL TR.COND A.132.0000-156.0000 CUT TO 5.1 IN (+ .0620/- .0000 IN) - BAND SAW CUTTING SPECIFICATIONS: AMS 5643	
N° de bon de commande / Purchase Order No 16358		Nbre de pièces / Part Number YOUR ITEM NUMBER: D6104-005		Qté commandée / Ordered Qty 6.00 PCS		Qté Facturée / Invoice Qty 6.0000 PCS	

Détails / Details		Usine / Mill		No de coulée / Heat Number		Code méc / Mech Id		Pièces / PCS		Largeur (Pouce) / Width (IN)		Longueur (Pouce) / Length (IN)		Qté expédiée / Shipped Qty(LBS)	
N° de livraison / Delivery No : 117437856				524906				6						112.37	

Ces marchandises/technologies sont sujettes aux règlements de l'Export Administration et du département d'état des États-Unis. Si elles ont été/sont exportées, elles doivent se conformer à ces règlements. Toute modification du contrat de transport contraire aux lois des États-Unis est interdite.

These commodities/technologies are subject to US Export Administration & US State Dept. Regulations and, if intended for export, were/are exported thereunder. Diversion contrary to US Law is Prohibited.

Nous certifions par la présente que le matériel couvert par cette certification est conforme aux spécifications susmentionnées et aux exigences applicables pour le matériel, y compris toute spécification faisant partie de la description. Les rapports d'essai sont archivés pour fins de consultation. Toute requête concernant du matériel défectueux sera rejetée à moins qu'elle ne soit faite par écrit à A. M. Castle & Co. dans les 60 jours suivant la livraison. Le matériel coupé sur mesure ou coupé par le client ne peut être retourné pour crédit.

We hereby certify the material covered by this certification conforms in accordance with the above specifications and has been found to meet the applicable requirements for the material, including any specifications forming a part of the description. Test reports are on file subject to examination. All claims for defective material are waived unless made in writing to A.M. Castle & Co. within 60 days of the shipment. Material cut to the correct size, or material cut by the customer cannot be returned for credit.

Ce matériel a été reçu et inspecté par

Date: Name:

These commodities, technology or software were exported from the United States in accordance with the Export Administration Regulations. Diversion contrary to US law prohibited.



Castle Metals®

A. M. Castle & Co.

BORDEREAU DE MARCHANDISES

Page 2 of 2

Reviewed by Authorized Castle Metals Representative:



Certificate of Test

HEAT 524906

ORDER 611545/ 05 BOL 0207994 * CERTIFICATION * 07/27/10

SHIP TO:
A. M. CASTLE METALS
3400 NORTH WOLF ROAD

FRANKLIN PARK

601310000

44586

YOUR ORDER & DATE
7/27/10 CUST# 0254001 CUST TAG#42464

ITEM DESCRIPTION
GRADE 17-4 Ship Condition CONDA
Size 17-4 RND HEART CONDA 4.0000 x 144.000 RL
Country of Melt: SWEDEN Country of Mfg.: UNITED STATES
NAFTA Country of Origin is Country of Melt

No weld repair
Free of mercury contamination, Free of radiation contamination
No WEEE relevant substances; Meets EU electrical ROHS

Total Bundles 1 Total Weight 1885

WO 2010049 Bundles: 1A

SPECIFICATIONS
MFG TO FINISHED BAR IN THE USA FROM BILLETS IMPORTED SWEDEN
AMS 2303E
ASME SA182 E07 A07, A08 & A09
ASTM A484 09
DFARS 252.225.7014 6/05
UNS S17400, AISI 630
Free of Mercury Contaminatio
ASME SA564 E07
ASTM A564 04 Type 630
Reduction Ratio 3:1 minimum
No weld repair
AM Castle 3174-10 R8

MECHANICAL & OTHER TESTS
Hardness as shipped 286 HB Hardness as tested 400 HB
Hardness as shipped 030 HRC Hardness as tested (43 HRC)
Grain size 5.0 Tensile strength, KSI (MPa) 196.0 (1351)
Micro OK 0.2% Yield Strength, KSI (MPa) 175.0 (1207)
Intergranular corrosion OK
Macro OK
Elongation % in 4D 13.0
Reduction of area % 42.0
Ferrite 1.0

CHEMICAL COMPOSITION
Carbon (C) .012 Manganese (Mn) .730
Phosphorus (P) .021 Sulphur (S) .025
Silicon (Si) .390 Chromium (Cr) 15.350
Nickel (Ni) 4.710 Cobalt (Co) .034
Copper (Cu) 3.270 Moly (Mo) .170
Nitrogen (N) .021 Columbium (Cb) .350
Titanium (Ti) .005 Aluminum (Al) .003
Tin (Sn) .005 Cerium (Ce) .010
Boron (B) .001 Tantalum (Ta) .005
Vanadium (V) .051
Columbium/ Tantalum (Cb+Ta) .355
Iron (Fe) Balance
Frequency .000
Melt Practice EAF
Refining Practice AOD
De-long Ferrite
Severity .000

Knowingly & willfully falsifying or concealing a material act on this form, or making false, fictitious or fraudulent statements or representations herein could constitute a felony punishable under federal statutes. We hereby certify that the test results shown in this report are correct and accurate as contained in the records of the company and are in compliance with the specifications, codes, and standards listed above.

M.F. Marcanio, Quality Manager

M.F. Marcanio

HEAT NUMBER 524906
MECHANICAL ID 42464
ITEM CODE 42464
LOT NUMBER 44886
PO NUMBER 1-29-2010
RECEIPT DATE 0470KAMP0
SUPPLIER
SPECIFICATION M
LCS
COMMENT
APPROVED

Castle Metals FP